

CLAIMS

What is claimed is:

1. A method of forming an MIM capacitor, comprising:
 providing a substrate;
 providing a capacitor opening in said substrate;
 providing a bottom electrode in said capacitor opening;
 annealing said bottom electrode;
 providing a dielectric layer on said bottom electrode;
and
 depositing a top electrode on said dielectric layer.
2. The method of claim 1 wherein said top electrode has a substantially organic-free content.
3. The method of claim 1 wherein said annealing said bottom electrode comprises exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing.
4. The method of claim 3 wherein said top electrode has a substantially organic-free content.
5. The method of claim 1 wherein said top electrode is deposited on said dielectric layer using a deposition temperature of no greater than about 400 degrees C.

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6. The method of claim 5 wherein said top electrode has a substantially organic-free content.

7. The method of claim 5 wherein said annealing said bottom electrode comprises exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing.

8. The method of claim 7 wherein said top electrode has a substantially organic-free content.

9. A method of forming an MIM capacitor, comprising:
 providing a substrate;
 providing a capacitor opening in said substrate;
 providing a bottom electrode in said capacitor opening;
 annealing said bottom electrode;
 providing a dielectric layer on said bottom electrode;
and
 depositing a top electrode on said dielectric layer
using a plasma-free deposition process.

10. The method of claim 9 wherein said top electrode has a substantially organic-free content.

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11. The method of claim 9 wherein said annealing said bottom electrode comprises exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing.

12. The method of claim 9 wherein said top electrode is deposited on said dielectric layer using a deposition temperature of no greater than about 400 degrees C.

13. The method of claim 9 wherein said plasma-free deposition process is a thermal chemical vapor deposition process or an atomic layer deposition process.

14. The method of claim 13 wherein said top electrode has a substantially organic-free content.

15. The method of claim 13 wherein said annealing said bottom electrode comprises exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing.

16. The method of claim 13 wherein said top electrode is deposited on said dielectric layer using a deposition temperature of no greater than about 400 degrees C.

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17. A method of forming an MIM capacitor, comprising:

- providing a substrate;
- providing a capacitor opening in said substrate;
- providing a bottom electrode in said capacitor opening;
- subjecting said bottom electrode to chemical mechanical planarization;
- annealing said bottom electrode;
- providing a dielectric layer on said bottom electrode;

and

- depositing a top electrode on said dielectric layer using a plasma-free deposition process.

18. The method of claim 17 wherein said top electrode has a substantially organic-free content.

19. The method of claim 18 wherein said annealing said bottom electrode comprises exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing.

20. The method of claim 19 wherein said top electrode is deposited on said dielectric layer using a deposition temperature of no greater than about 400 degrees C.